United Nations Industrial Development Organization

Distr.
LIMITED

28 August 1989
ID/WG.487/3

ORIGINAL: ENGLISH

Third Consultation on the Capital Goods Industry
with emphasis on Rural Transport Equipment

Vienna, Austria, 4-8 December 1989

Issue Paper II

PROMOTION OF (AND INTERNATIONAL CO-OPERATION IN) LOCAL MANUFACTURE OF RURAL TRANSPORT EQUIPMENT*

Prepared by the UNIDO Secretariat

---

* This document has not been edited.

V.89-58883

CONTENTS

		Page
I.	INTRODUCTION	1
II.	RURAL TRANSPORT EQUIPMENT SUB-SECTOR IN DEVELOPING COUNTRIES	2
	(a) Present performance and role in industrial development	2
III.	APPROACHES TO THE PROBLEMS FACING THE SUB-SECTOR	4
IV.	PROBLEMS AND PROSPECTS OF LOCAL PRODUCTION OF RURAL TRANSPORT EQUIPMENT	7
V.	FINAL CONSIDERATIONS	10

I. INTRODUCTION

1. It is well recognized that the capital goods sector is a priority area in industrialized countries and in a number of developing countries. This is because it has a crucial role in the innovative process in industry as well as in agriculture and in the service sector. Also there is a strong link between economic growth and demand for capital goods. Its basic function being to supply machinery and tools to the rest of the economy thereby contributing to capital formation and, moreover, instrumental in technological change and its diffusion in the economy.

2. In developing countries, the production of capital goods represents only 10 to 15 per cent of the total manufacturing (in terms of value added) whilst this figure is 30 to 35 per cent in industrialized countries. The developing countries' share - including the People's Republic of China - in the world production of capital goods is 8 per cent[1/].

3. The capacity of developing countries to formulate and implement appropriate and selective policies is crucial to the improvement of this situation.

4. All developing countries have given high priority to satisfying the basic needs of their population and are concentrating their efforts on achieving food security and national self-sufficiency in food production and the surplus associated with export expansion. It is clear that these goals can only be achieved by a number of policy changes including an active policy aimed at farm mechanization appropriate to the physical, cultural, economic and technological environment of a country or region.

5. Transport is one of the main links in the process of agricultural development. Analysis of the economic policy implemented in various developing countries revealed that the weak link in the chains of production is the transport of products in rural areas, especially to the centers of consumption and export. The inefficiency of the system ultimately nullifies

---

1/ The Capital Goods Sector in Developing Countries. Technology Issues and Policy Options. UNCTAD 1985

the efforts and priority accorded to the agricultural sector (loans, subsidies, insurance, mechanization) because the transport system is deficient and excessively costly, having problems inter alia with regard to storage infrastructure, co-ordination in the availability of properly equipped vehicles, frequency of services and the compatibility of load-carrying capacity with seasonal agricultural activity.

II. RURAL TRANSPORT EQUIPMENT SUB-SECTOR IN DEVELOPING COUNTRIES

(a) Present performance and role in industrial development

6. As described in the first issue paper, the present situation is characterized by a common lack of attention to development of rural transport equipment. Indeed, all available data implies that transport facilities available in rural areas are few and most of the time, inappropriate.

7. The principal rural products are derived from agriculture, stock farming, mining and fishing and have to be carried from the fields, deposits or places where catches are landed to centres for collection and primary processing (sorting, washing, treatment for long-distance transport) where, after suitable treatment, they are transferred to the domestic processing or consumption centres as well as to ports or export destinations.

All these processes and operations make up the complex operating system of the corresponding chain of production (agriculture, stock farming, mining and fishing), comprising the relevant primary production activities (cultivation or extraction), industrial processing and those activities related to the transfer of products from one process to the other and their intermediate or final consumption (transport).

Figure 1.1.

	Typical chain of production	
	Collection	Consumption
Primary production	Selection	Manufacture
	Treatment	Export

This system for the functioning of a chain of production makes clear the role played by the transport of the products, primarily in the rural environment itself (a), and in later distribution (b), as schematically presented in figure 1.1.

8. It is also clear that an efficient chain of production depends not merely on the bounty of nature in endowing a country with abundant natural resources, nor on the intensity of the capital and technology applied in primary production or manufacture but also on the appropriate management and operation of the services that are linked to the chain of production, in which context transport of materials and manufactures assumes special importance.

9. Transport of agricultural products has also an appreciable industrializing effect and there is an underdeveloped potential owing to the lack of specific studies and policies for promoting particular types of transport equipment that would provide appropriate handling of potentially exportable products, which in some countries represent the main source of foreign exchange earnings. Striking features of the production of rural transport equipment are the simplicity of design involved and the ease with which the technology can be mastered as well as the intensive utilization of locally produced materials. The development of the iron and steel and metallurgy industries in most Latin American countries for example, advances with the rise in the technical level and mechanization of the agricultural and rural transport sectors, the latter of which has enormous potential for development and for large-scale dissemination of techniques and equipment used by innovative entrepreneurs in relation with export crops.

10. The dynamic industrialization potential inherent in the manufacture of equipment for transporting agricultural products in rural areas can be seen by the example of Brazil, which in 1986 produced 51,289 units of various types of equipment, as against 26,937 and 23,384 units in 1984 and 1985 respectively (see table on page 4).

Brazil: Production or rural transport equipment
(units)

Product	1984	1985	1986
Sugar-cane loaders	734	880	950
Grain hoppers	423	483	1,088
Fixed or tipping carts and trolleys	13,346	16,529	23,265
Elevators	6,134	4,861	16,341
Shovel loaders	3,314	127	5,683
Platform trucks	2,986	504	3,962
Total	26,937	23,384	51,289

Source: Economics and Statistics Division, ABIMAQ - SINDIMAQ

11. In Asia, improved designs should be developed in each country for local manufacture of tricycles, trailers for bicycles, motorcycles etc. Manufacturing of tractors, trucks and other capital equipment in various Asian countries are at different stages of development. At present most of the countries have already set up heavily protected import substitution industries. However, as manufacturing sectors become more mature, each country will become more specialized. Intra-regional trade in manufactured goods should then grow, creating an environment conducive to regional co-operation.

III. APPROACHES TO THE PROBLEMS FACING THE SUB-SECTOR

12. Past strategies concentrated more on provision of roads in the majority of developing countries. Since track and vehicle are complementary and mutually dependent parts of the road transport system, most developing countries should consider the possibilities of local manufacture of the vehicles and other capital equipment they need for their transport infrastructure, particularly for rural areas. For that purpose, it is necessary to:

- identify the transport needs of rural communities, bearing in mind the characteristics and requirements of agricultural production as well as geographical locations;
- make decision-makers broaden planning procedures so that they reflect transport and vehicle-oriented, as well as road-oriented, viewpoints;
- include, whenever possible, in transport policies the manufacture of vehicles from low-cost to more expensive ones, wherever appropriate, as part of the effort to develop small- and medium-scale industries.

13. In this perspective, the development of domestic manufacture of rural transport equipment and other capital equipment (storage and cooling equipment, spare parts etc.) calls for, first and foremost a considerable effort on the part of developing countries themselves. Through such an effort they can build up their human resources and an industrial base, especially for newcomers, that enables them to negotiate with the owners of technology and increase their participation in project development.

14. To develop appropriate transport equipment suited to local conditions as well as the proper handling and carriage of agricultural products in rural areas and their transfer to market centres and for export, efforts should concentrate on those products that constitute the most characteristic chains of production in each country.

15. For this purpose, and to ensure proper planning and development of rural transport equipment, it is suggested that:

(a) Each country should prepare specific diagnoses of the situation relating to transport of the main crops in both the rural environment as well as over long distances (large volumes of products);

(b) concerted programmes be established for the manufacture of special types of equipment, by specific products, with participation of government, industry, research institutions and users of transport services which may be the farmers themselves. These programmes should include establishment of a framework whereby producers and consumers are encouraged to enter into contractual arrangements for the production, procurement and financing of such transport equipment;

(c) the framework should determine the responsibilities in each country of each body in the implementation of the concerted plan between agricultural and industrial sectors and the transport sector; provision should also be made for the technical and financial support, service and other promotion instruments that are considered necessary, such as tax, credit and customs incentives for the procurement of the equipment included under the programme. The existence of technological design and research institutes as support elements for the programmes if of fundamental need in implementing the programmes, in addition to standardization in the uses and local manufacture of appropriate equipment. To this end, it will be necessary to consider setting up a steering body to co-ordinate and implement the programme, which should include representatives of entrepreneurs and government from agriculture, industry and transport.

16. The success of such programmes, however, depends to some extent on efforts to build up an autonomous industrial and technological core which can be sustained and constantly strengthened. In most developing countries, and especially those least developed, the problems of design, manufacturing and operation of machines, and organization of production, represent the most sensitive points in the production process. There is a need to develop and/or improve national technological capabilities in those countries. In this connection, flexible manufacturing units for production of capital goods products is relevant in most developing countries. The flexible small- and medium-scale units offer a number of advantages, inter alia:

(a) flexibility between product and technological process of production;
(b) technological process of manufacture based on universal machinery capable of different basic operations (cutting, welding, machining) in which labour plays a determining role;
(c) production of small quantities of a great variety of products of a relatively low technological complexity;
(d) with proper design, the production processes can be simplified and thus made more appropriate for conditions existing in the developing countries;
(e) plant lay-out can be designed to permit the production of small quantities of different products by universal machines;
(f) horizontal integration achieved with the domestic technological infrastructure.

17. The flexible units permit the manufacture of a great variety of machinery and equipment including spare parts needed to develop key sectors such as agriculture, food, construction, transport. They are also able to maintain imported equipment. Moreover, they permit more rational utilization of existing installed capacity. In addition, because of the small investment needed, relative to that for big specialized production units, new plants can be installed. This line of production can also play an important role in promoting the development of the domestic technological infrastructure and a national engineering capacity, which can help to generate a more self-reliant development.

IV. PROBLEMS AND PROSPECTS OF LOCAL PRODUCTION OF RURAL TRANSPORT EQUIPMENT

18. For many developing countries the importance of providing appropriate rural transport equipment is recognized and governments and private enterprises in most of these countries are making the necessary efforts to overcome the problems associated with the provision of transport services/equipment and implements for rural industrial development. Indeed, rural workshops as well as urban industries engaged in the development of the capital goods sector are facing technological problems, such as lack of appropriate raw materials and proven design, standardization in production operations, skilled manpower, training system for the development of national capabilities required in mechanical engineering. They are also confronted with the question of demand for a great variety of simple equipment/aids in limited quantities etc.

19. In view of this situation, there is a need to increase human and financial resources devoted to research and development as regards design and technical studies, and to encourage the development of consulting services and licensing arrangements for transfer of technology to be adapted to local conditions. In this endeavour, the most fundamental requirement should be an appraisal of the needs of small farmers and their requirements for transport services suited to the main crops produced in the country or in the region.

20. Owing to the fact that the majority of developing countries have small and scattered markets with diversified requirements, specialization in production - although it is a progressive mode of production practised in almost all developed countries - cannot be applied to the majority of developing countries, especially those with an embryonic capital goods sector or contemplating entry thereto. Thus, there is the need to establish forms of production that can meet

diversified requirements (rural transport equipment/aids, agricultural machinery and implements, spare parts etc.) of the agricultural sector as well as industry. For that purpose, the small- and medium flexible units, as described above, could be one of the ways to overcome some of the main technological problems. Specialization could become appropriate in the production of some specific rural transport equipment as demand increases and progress is made in the mastering of technologies;

22. Emphasis as to the principal lines of action in promoting and improving the national manufacture of equipment will vary from country to country according to the level of industrial development achieved in the field of metalworking production. In view of the problems confronting most developing countries, as described above, co-operation could be developed in the areas of design and prototype exchange, and human resources development. Moreover, regional organisations such as the African Regional Center for Engineering Design and Manufacturing (ARCEDEM) in Africa, the Regional Network for Agricultural Machinery (RNAM) in Asia and the Andean Group in Latin America, could act as focal points to exchange information on developments equally adaptable to other countries of the region. In this perspective, international organizations such as UNIDO could provide technical assistance, for example in the design and local manufacture of low-cost transport equipment in small- and medium-scale enterprises. Also, international co-operation should aim at mobilizing financial resources required in promoting local production of capital goods as a whole.

23. It should be noted that small- and medium-scale enterprises of developed countries, because of their ability to adapt their production to a specific demand and their capability to manufacture a wide range of products, have the necessary flexibility to transmit many innovative ideas to meet the diversified needs of developing countries using new forms of industrial co-operation.

24. In developing countries various possibilities of co-operation exist as regards promotion of the capital goods sector in general and the rural transport equipment sub-sector in particular. For example:

a) Co-operation among developing countries would encourage exchange of information on national strategies of developing countries so that an overall analysis is carried out to find global solutions for common problems and at the same time to analyse the production complementarities

at the regional level. This co-operation could be developed in the areas of (i) exchange of experiences in the field of design and production technology that would permit an increase in the productivity of existing plants and develop new types of machinery and equipment; (ii) training of manpower to master the production process and other activities, such as operation, repair and maintenance etc.

b) Co-operation between developed and developing countries could be oriented towards sustaining in various ways the efforts of developing countries to improve their national technological capabilities and train the required skilled manpower to reinforce the domestic engineering. To that effect, efforts should be made to facilitate the participation of small- and medium-scale industries producing capital goods in developed countries in the transfer of technology towards developing countries. Thus, interested developing countries could benefit from a large number of suppliers of technology.

V. FINAL CONSIDERATIONS

25. In view of the current situation described above the Meeting may wish to examine the following proposals in the context of increased North-South and South-South cooperation.

a) In order to realize the potential for self-sustaining industrialization in the operation of an articulated production structure, it is necessary to consider not only the production of inputs and capital goods to meet the requirements of agriculture but also demand for transport. It is necessary to develop appropriate transport equipment suited to the proper handling and carriage of agricultural products in rural areas as well as the transfer of these products to market centres and for export; efforts should concentrate on those products that constitute the most characteristic chains of production in each country.

b) Transport as a service and as a branch of industry can make a major contribution to increasing and sustaining agricultural production as well as industrial output in developing countries. To that end, transport planning should start with the various needs of farmers and develop transport equipment or aids within the context of the capital goods industry as a whole. That would also contribute to achieving the development objectives in such priority areas as rural development, reduction of rural exodus, social and economic balances between rural and urban areas, inequalities, and better utilization of local resources.

c) The demand for rural transport equipment should be assessed as the basic guide for industrial production, giving special attention to the real needs and the capabilities of the users.

d) To meet the aforesaid demand, a decision has to be made to the extent of forms of local production in order to determine the technological and economic dimensions of the local production.

e) In this context there is a definite need to establish or strengthen the liaison between producers and the scientific and technical infrastructure in a strategy which combines traditional and new technologies.

f) Technological, managerial and economic information on the capital goods sector in general and the rural transport sub-sector in particular should be available. Based on this premise, an exchange of information among industry, research centres and other institutions, including potential beneficiaries should be developed and promoted on a regional and global basis for better utilization of existing facilities and potential.

g) Skilled manpower and financial resources are also required for the development of the sub-sector. In human resources development, developing countries should develop an integrated programme of training for local producers and users of the sub-sector outputs. In this connection, a number of small- and medium-sized enterprises in developed countries, some of them specialized in training, could play an important role in providing training programmes for developing countries in each area of specialization. With regard to financing which is one of the major constraints to industrial development, if high priority were given to the local manufacture of selected rural transport equipment, as a key factor in rural development, most financial constraints in developing countries could be overcome. Choosing an appropriate policy and strategy in allocating the available resources and exploring the possibilities offered by international and regional institutions such as the World Bank, the International Fund for Agricultural Development (IFAD), the Asian Development Bank, the African Development Bank, the Arab Bank for Economic Development in Africa (BADEA), etc., could contribute to solving financial problems.

The Consultation is therefore invited to:

(a) Discuss the present status of rural transport with emphasis on the provision of appropriate transport equipment and the potential for its promotion, development and expansion;
(b) Discuss the potential for, and perspectives of mixing traditional and new technologies aimed at cost-effective domestic production;
(c) Identify common and specific constraints to local manufacture of rural transport equipment through flexible plants;
(d) Examine and propose ways and means for regional, interregional, and international co-operation and actions needed to overcome identified problems and constraints;
(e) Propose defined project ideas to increase technical assistance and investment promotion activities to be considered for implementation by international organizations concerned, as well as north-south and south-south co-operation.